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Mr. Edward W. Crump
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland, 20771

Attention: Mr. Edward W. Crump, Code 430

Subject: Monthly Progress Report for Period Ending 1 July 1973

Contract: ERTS Image Data Compression Technique Evaluation
MMC #153


Principal Investigator: Dr. Donald J. Spencer, GSFC ID PR512

During the month of June, several runs were made using a full scene of tape 1015-17440, centered on the Imperial Valley of Southern California, and containing a variety of object classes: agriculture, river, mountains, trees, airport, and barren land. This scene was processed in several fashions:

1. Data and compression statistics were obtained based on the SSDI, SSDIA, SSDIAM, and SHELL algorithms for strictly information preserving data compression.
2. Tapes of the compressed data were obtained to permit later reconstruction and to prove that in general four ERTS MSS tapes can be put onto a single compressed tape.
3. The compressed tape was reconstructed and imagery made.
4. The data was compressed using the essentially information preserving SSDIAM algorithm, with mappings of from 1 to 3 levels and imagery was made of the result. This imagery shows that no visual degradation results from the one level mappings while compression is significantly increased. Mappings of up to three levels shows negligible deterioration in areas of moderate to high data activity (mountains, agriculture, rivers, airport) but contouring is noticeable in areas of uniform data such as the plains region.

5. The compressed tape was run through a simulation of a noisy transmission channel such as might occur if the compression were performed on board a spacecraft. At a bit error rate of 10^{-6} , the imagery was reconstructed and photographs made to determine image deterioration resulting. The results show that the distortion incurred by such an error is confined to that portion of a scan line between the occurrence of the error and the next memory update point.

The results obtained during June are very encouraging. Several more full scenes and the remaining six subscenes will be processed during July to determine compression statistics representative of the predominant object classes encountered by ERTS 1. Dr. May visited GSFC on June 28 to present some of the results obtained to William Alford, the scientific monitor, and to discuss the form of the final report.


Donald J. Spencer

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